



## CERTIFICATE

I, Jochen Sties, of Manzingerweg 7, 81241 München, Germany, declare that I am conversant with the German and English languages, and that to the best of my knowledge and belief the accompanying text is a true translation of the priority document issued by the German Patent and Trademark Office on June 11, 2003, for Serial No. 102 38 064.3.

Signed this 21st day of July 2004

A handwritten signature, likely of Jochen Sties, written over a horizontal line.

Certified Translation



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**Certificate of Priority Relating to the Filing  
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**Title:** Roof Module with Movable Lid and Rigid Sealing Strip

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**The attached documents are a correct and true copy of the original documents of this patent application.**

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## Roof Module with Movable Lid and Rigid Sealing Strip

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This invention relates to a roof module with an outer skin in which at least one slot is provided, into which can enter in particular a holding element for a lid which is movable between a closed position and an open position.

- 5        Such roof module is known from German Utility Model 298 20 613. The lid is part of a sliding roof system and in the open position clears a roof opening in the roof module. In the open position, the lid lies on the outside of the roof module in the manner of a spoiler.

- 10        To ensure a stable guidance of the lid, the same is connected with a holding element, which is movable in a guide rail at the roof module, not only at its front edge as seen in direction of travel, but also at its rear edge. To ensure that the lid can be moved sufficiently to the rear and completely clears the roof opening, despite the fact that a holding element is also provided at its rear edge, there is provided the slot into which the holding element can enter. To prevent excessive  
15        wind noise, strong ingress of water and soiling, there is provided an elastically deformable seal for sealing the slot, which seal is mounted at the lateral edge of the slot and is locally urged to the side by the holding element, when the holding element immerses into the slot.

The disadvantage of the known construction consists in that the flexible seal does not cover the slot completely flush. Moreover, the possibility of an adaptation of the color of the seal to the color of the roof module is greatly restricted. In the case of high demands as to the optical appearance this is possibly  
5 regarded as disturbing.

The object of the invention consists in developing a roof module as mentioned above to the effect that even high requirements as to the optical appearance can be satisfied.

For this purpose, the invention provides a rigid covering element, which is  
10 movable between a closed position in which it closes the slot and an open position in which it clears the slot for the carriage. A rigid covering element can be designed such that it terminates flush with the edges of the slot. The covering element can be adapted to any course of the outer skin, i.e. also extend in a three-dimensionally curved form. Since the covering element is dimensionally stable,  
15 the precision of the termination with the edges of the slot is also maintained over a long time of operation and is not subjected to wear.

In accordance with the preferred embodiment it is provided that in the open position the covering element is disposed below the outer skin, in particular by means of a connecting link guide, in which it is movable and which is mounted  
20 below the outer skin. This provides for easily moving the covering element under the outer skin, where it neither disturbs the optical appearance nor can cause wind noise, for example.

In accordance with the preferred embodiment of the invention it is provided that the covering element has a body and a strip protruding therefrom, which strip  
25 engages in the slot. A broader body allows to directly provide two drip rails at the covering element, which drip rails can collect possibly entering water and discharge the same in a controlled way.

For sealing purposes, two seals can be mounted at the body, which rest against the outer skin when the covering element is in the closed position. In addition, two

seals are preferably mounted at the strip, which rest against the outer skin when the covering element is in the closed position. Water penetrating to the inside despite the seals between the strip and the outer skin is then collected by the drip rail. The seal between the body and the outer skin prevents the water from advancing further into the interior of the roof module, proceeding from the drip rail.

The covering element can be made of any suitable material which at a low weight provides for the desired high dimensional stability, for example metal or plastics. Thus, the covering element can easily be painted. A covering element made of plastics can also be dyed.

In order to move the covering element when the lid is moved into the open position and its holding element enters into the slot, a simple contact surface at the covering element may be sufficient, which is engaged by the holding element to move the covering element from the closed position into the open position. In this case, a spring is preferably provided, which urges the covering element into the closed position, so that when closing the lid the covering element follows the holding element thereof and automatically returns to the closed position. Alternatively, it may be provided that a coupling formation is provided at the covering element, which can be engaged by a carrier in order to move the covering element. In this case, the covering element would be directly retracted from the holding element and back into the closed position.

The invention will subsequently be described with reference to a preferred embodiment which is represented in the attached drawings, in which:

- Figure 1 shows a schematic top view of a roof module in accordance with the invention with two lids which are in the closed position;

- Figure 2 shows the roof module of Figure 1, the two lids being in the open position;

- Figure 3 shows a perspective view of the roof module of Figure 2;

- Figure 4 shows a schematic top view of the region IV of Figure 1 on an enlarged scale;

- Figure 5 shows a schematic side view of the region shown in Figure 4, the covering element being in the closed position;

5       - Figure 6 shows a section along the plane VI-VI of Figure 5;

- Figure 7 shows a view corresponding to the view of Figure 5, the covering element being in a slightly open condition;

- Figure 8 shows a section along the plane VIII-VIII of Figure 7; and

10       - Figure 9 shows a view corresponding to the view of Figure 7, the covering element being in a more open position.

Figure 1 shows a roof module 10 which has a first lid 12, a second lid 14 and a stationary roof element 16. The first and second lids 12, 14 can be moved from the closed position as shown in Figure 1, in which they close a roof opening 18 of the vehicle, into an open position as shown in Figures 2 and 3, in which they clear the roof opening 18. The second lid 14 then lies below the stationary roof element 16, and the first lid 12 lies above the stationary roof element 16.

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To ensure that the first lid 12 and the second lid 14 are movable, two guide rails 20 are provided at the roof module 10. They are disposed at the roof module below the surface defined by an outer skin 22 of the roof module, i.e. by the stationary outer surfaces of the roof module. In the guide rails 20, various holding elements are movably accommodated, at which the two lids 12, 14 are mounted. Of these holding elements only the front holding elements 24 and the rear holding elements 26 of the first lid 12 are shown (see Figure 3). The exact structure of the guide rails 20 as well as the way of adjusting the holding elements for the two lids in the guide rail are not relevant for the understanding of the invention.

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In the outer skin 22 of the roof module, to be more precise along the lateral edges of the stationary roof element 16, two slots 28 are provided. Into these slots,

the two front holding elements 24 and the two rear holding elements 26 can enter when the first lid 12 is moved to the rear into the open position in which the lid 12 is located above the stationary roof element 16.

Figure 4 shows the slot 28, which proceeding from the roof opening 18 is  
5 located between the roof element 16 and the portion of the outer skin 22 disposed laterally of the same. The slot extends as far to the rear as is required for the rear holding element 26 of the first lid 12.

There is provided a covering element 30 (see also Figure 6) which consists of a body 32 of generally rectangular cross-section and a strip 34 which likewise has  
10 a rectangular cross-section and centrally protrudes upwards from the body. The covering element 30 is movably mounted below the outer skin 22 or the stationary roof element 16, namely between a closed position shown in Figures 5 and 6, in which the strip 34 engages in the slot 28 and terminates flush with the outer skin on the outside of the roof module, and an open position in which the covering  
15 element 30 has been moved to the rear, in the direction of the arrow P of Figure 4, under the outer skin 22.

The covering element 30 is provided with two seals 36 at the body 32 and two seals 38 which are mounted laterally at the strip 34. Alternatively, one circumferential seal each can be used. The seals 36, 38 rest against the bottom surface of  
20 the outer skin when the covering element 30 is in the closed position. Around the strip, two drip rails 40 are provided, in which water can be collected, which despite the seals 36 enters through the gap 28 into the space between the outer skin 22 and the covering element 30. Alternatively, a single circumferential drip rail can be used. There may be provided an outlet (not shown) for discharging this  
25 water in a controlled way.

The covering element 30 is movably mounted below the outer skin 22 by two connecting link guides 42. Each connecting link guide on the one hand consists of a first connecting link 44 in each of two mounting angles 46 which are mounted on both sides of the covering element 30 on the bottom surface of the outer skin

22. In each of the two first connecting links 44 there engages a first connecting link bolt 48, which is firmly mounted in the covering element 30. The connecting link guide 42 on the other hand consists of two second connecting links 50, which are formed in the vertical side walls of the body 32 of the covering element 30 and in each of which engages a second connecting link bolt 52, which is firmly accommodated in the corresponding mounting angle 46. Both the first connecting link 44 and the second connecting link 50 have an inclined portion in the region in which engages the corresponding connecting link bolt when the covering element is in the closed position, so that when the covering element 30 is adjusted to the rear in the direction of the arrow P, proceeding from the closed position, it is first adjusted to the rear and downwards at an angle below the plane of the outer skin 22 and then under the plane of the outer skin 22 to the rear. Figure 9 shows a position of the covering element 30 in which the same has been adjusted to the rear by about half the maximum possible distance. The covering element can be moved until the first connecting link bolt 48 has reached the end of the first connecting link in the position 48' as shown in Figure 9. In this completely open position, the slot 28 has been completely cleared, so that the two holding elements 24, 26 can freely enter into the slot.

The covering element 30 can be moved from the closed position into the open position in that the rear holding element 26 or a carriage connected therewith, which is accommodated in the guide rail, rests against a contact surface of the covering element and moves the same directly to the rear. In this case, there is preferably provided a spring (not shown) which urges the covering element 30 into the closed position. This ensures that the covering element automatically returns to its closed position when the rear holding element 26 leaves the slot 28. Alternatively, a carrier may be provided at the holding element, which couples to the covering element 30 to push it to the rear into the open position and also to pull it to the front again into the closed position.



List of Reference Numerals:

	10: roof module
	12: first lid
5	14: second lid
	16: roof element
	18: roof opening
	20: guide rail
	22: outer skin
10	24: front holding element
	26: rear holding element
	28: slot
	30: covering element
	32: body
15	34: strip
	36: seal
	38: seal
	40: drip rail
	42: connecting link guide
20	44: first connecting link
	46: mounting angle
	48: first connecting link bolt
	50: second connecting link
	52: second connecting link bolt
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### Claims

1. A roof module with an outer skin (22) in which a slot (28) is provided, into which can enter in particular at least one holding element (24, 26) for a lid (12, 14) which is movable between a closed position and an open position,  
5 characterized in that a rigid covering element (30) is provided, which is movable between a closed position in which it closes the slot (28) and an open position in which it clears the slot (28) for the holding element.
2. The roof module as claimed in claim 1, characterized in that in the open position the covering element (30) is disposed below the outer skin (22).
- 10 3. The roof module as claimed in claim 1 or claim 2, characterized in that the covering element (30) is movable in a connecting link guide (42) which is mounted below the outer skin.
4. The roof module as claimed in any of the preceding claims, characterized in that the covering element (30) has a body (32) and a strip (34) protruding  
15 therefrom, which engages in the slot (28).
5. The roof module as claimed in claim 4, characterized in that the body is provided with at least one drip rail (40).
6. The roof module as claimed in claim 4 or claim 5, characterized in that at the body (32) at least one seal (36) is mounted, which rests against the outer skin  
20 (22) when the covering element (30) is in the closed position.
7. The roof module as claimed in any of claims 4 to 6, characterized in that at the strip (34) at least one seal (38) is mounted, which rests against the outer skin (22) when the covering element (30) is in the closed position.
8. The roof module as claimed in any of the preceding claims, characterized  
25 in that the covering element (30) is made of metal.

9. The roof module as claimed in any of claims 1 to 7, characterized in that the covering element (30) is made of plastics.

10. The roof module as claimed in any of the preceding claims, characterized in that the color of the covering element (30) is adapted to the roof module.

5        11. The roof module as claimed in any of the preceding claims, characterized in that the covering element (30) is provided with a contact surface to be engaged for instance by the holding element for the lid, in order to move the covering element from the closed position into the open position.

10       12. The roof module as claimed in claim 10, characterized in that a spring is provided, which urges the covering element (30) into the closed position.

13. The roof module as claimed in any of claims 1 to 9, characterized in that at the covering element (30) a coupling formation is provided, which can be engaged by a carrier, in order to move the covering element.

Abstract

Roof Module with Movable Lid and Rigid Sealing Strip

This invention relates to a roof module with an outer skin (22) in which a slot (28) is provided, into which can enter in particular a holding element (24, 26) for a lid (12, 14) which is movable between a closed position and an open position, characterized in that a rigid covering element (30) is provided, which is movable between a closed position in which it closes the slot (28) and an open position in which it clears the slot (28) for the holding element.

Fig. 6